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The giant resin bee making its way west: First record in Kansas (Hymenoptera: Megachilidae)

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Abstract

The invasive giant resin bee (*Megachile sculpturalis* Smith) was first discovered in North America in 1994. A 2005 study provided the first predictive ecological niche model for any bee species and concluded that *M. sculpturalis*, then confined to the eastern United States, would eventually spread as far south as southern Florida, as far north as southern Ontario and Nova Scotia, and as far west as South Dakota, western Kansas, and northwestern Texas. Herein I provide the first record of *M. sculpturalis* from northeastern Kansas, documenting that the species has indeed continued its westward expansion in North America and the new available records entirely correspond to the earlier predictions.

Keywords

Invasive species, bees, Anthophila, Apoidea, potential distribution, ecological modeling

Introduction

The giant resin bee, *Megachile* (*Callomegachile*) *sculpturalis* Smith, a distinctive bee native to eastern Asia (China, Japan, Korea, and Taiwan: Iwata 1933, Wu 2005, and records in the American Museum of Natural History and University of Kansas Natural History Museum), has become adventive in the eastern United States since its presumably accidental introduction sometime in the early 1990's (Batra 1998, Mangum & Brooks 1997). The species was first collected in North Carolina in 1994, and it has since then steadily spread such that by 1999 it had already reached central Ohio (Mangum & Sumner 2003), and by 2000 it was recorded as far west as Athens, Alabama (Kondo et al. 2000). In 2000 records existed as far north as New York State (Ascher 2001) and by 2002 it reached Ontario, Canada (Mangum & Sumner 2003). More re-

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cently the northern front of its distribution has reached northern Vermont (Richardson 2005) as well as the Boston area (Rykken 2007), while towards the west records exist from western Indiana (Indiana Cooperative Agricultural Pest Survey 2006). According to pictures and comments posted on the internet, the bee had reached Iowa (undetermined location) by 2007. Herein I newly record *M. sculpturalis* from northeastern Kansas and discuss its continued expansion westward, in accordance with an earlier predictive, ecological niche model for the species (Hinojosa-Díaz et al. 2005).

Material

Megachile* (*Callomegachile*) *sculpturalis Smith
Figure 1

Material Female, Kansas: Douglas County, within Lawrence city limits (adjacent to main University campus), 28 June 2008, I.A. Hinojosa-Díaz (net captured). Deposited in the Snow Entomological Collection, Division of Entomology, University of Kansas Natural History Museum, Lawrence, Kansas, USA.

Comments The specimen was not freshly emerged, exhibiting relatively worn wings along their apices. This indicates that the female was old and had been quite active for some time. This wing wear suggests that either the female had newly dispersed

Fig. 1. Female of *Megachile sculpturalis* Smith captured in northeastern Kansas, USA.

into the area from some distance or, more likely, was part of a newly established population (since no *M. sculpturalis* have been found in previous summers, and such active and robust bees would have otherwise been noticed) and had spent considerable time seeking new, suitable nesting sites and nest materials.

Discussion

On June 28th of 2008, a single female specimen of *M. sculpturalis* (see above) was collected in Lawrence, Kansas, around 7:30 PM, while trying to enter an abandoned wood borrow of a carpenter bee [*Xylocopa virginica* (Linnaeus)] in a backyard very close to the main campus of The University of Kansas. This specimen constitutes the first record for the species in Kansas, as well as the first confirmed individual west of the Mississippi (not counting internet postings). As noted, the specimen is deposited in the Snow Entomological Collection, Division of Entomology, University of Kansas Natural History Museum. Despite the absence of systematic monitoring of the expansion of this species, its spreading pace seems remarkable. Based on an ecological niche model of the native-range of the species projected to North America, Hinojosa-Díaz et al. (2005) predicted that *M. sculpturalis* would potentially inhabit the entire eastern half of the United States as far west as western Kansas and northwestern Texas, and as far north as Nova Scotia, Canada (Fig. 2). The existing records are so far in agreement

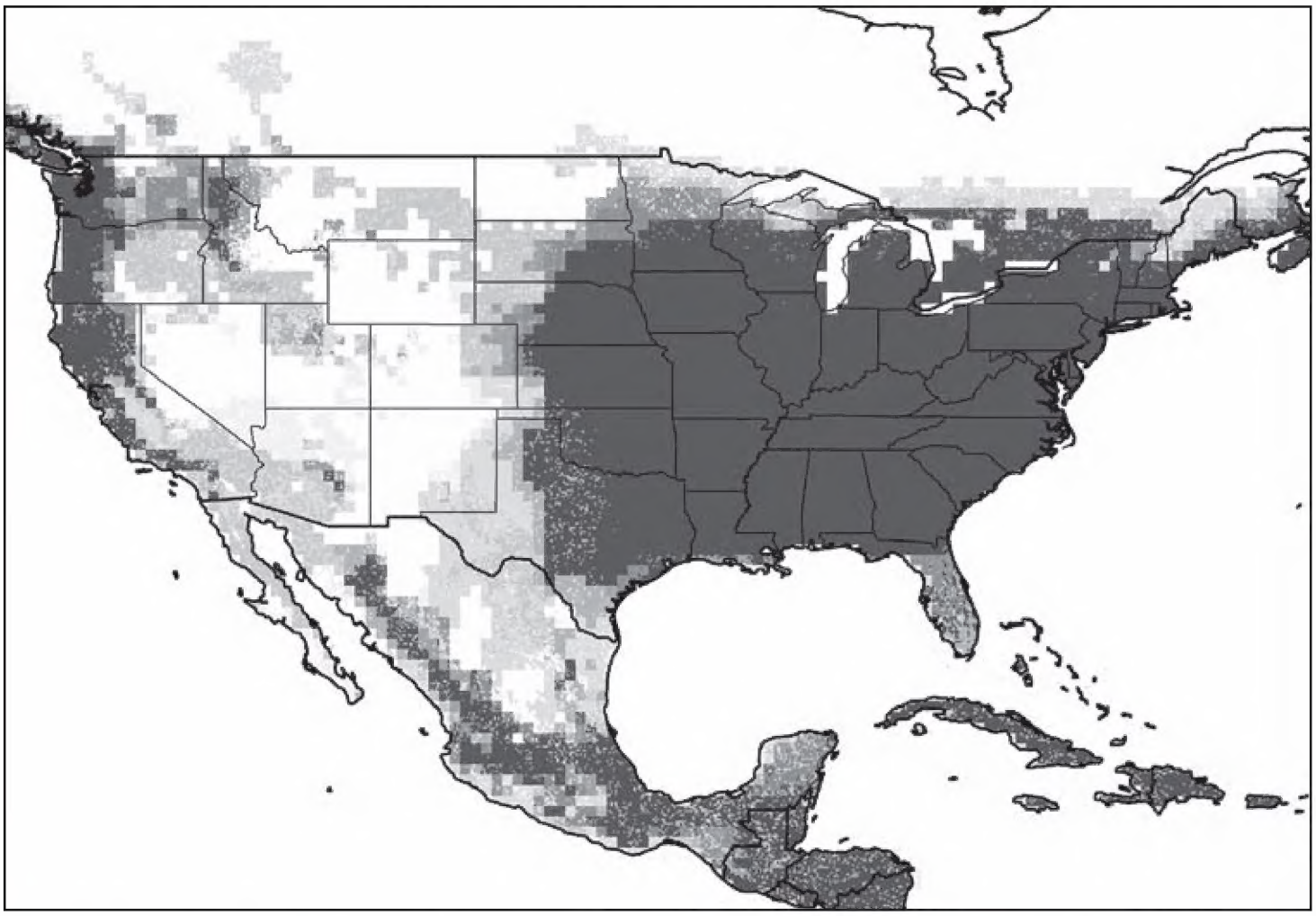

Fig. 2. Potential distribution of *Megachile sculpturalis* Smith in North America based on predictive ecological niche model proposed by Hinojosa-Díaz et al. (2005).

with the proposed model and it is still expected that the giant resin bee will continue on its way westward, filling out the potential distribution as defined by Hinojosa-Díaz et al. (2005). Figure 3 summarizes the available records for *M. sculpturalis* which have data suitable for georeferencing and mapping, and are plotted in accordance with year of collection. This pattern shows some insights on the rate at which *M. sculpturalis* is spreading in North America and, at least up to present, the strong concordance between the earlier predictions and subsequent records for the species. Continuous monitoring may ultimately confirm the accuracy of the potential distribution proposed by Hinojosa-Díaz et al. (2005).

Fig. 3. Observed distribution for *Megachile sculpturalis* Smith in the United States; records of the species mapped by time series according to available data; the star symbol corresponds to the record from Lawrence, Kansas.

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